EFFECTS OF DEVOLUTION ON EFFICIENCY OF AGRICULTURAL EXTENSION IN KHYBER PAKHTUNKHWAL, PAKISTAN

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Devolution of power plan is a form of decentralization, which was introduced to strengthen the functions of local government and empower the elected representatives with more authority and responsibility at the grass root level. How far this devolution of power has been effective in achieving its objectives especially with regard to agricultural extension seems an important area to be looked into. Data were collected on various aspects of agricultural extension from 280 randomly selected farmers and 70 Extension Field Staff (EFS) respondents. The results show that supervision of subordinate offices was highly improved as a result of devolution and was ranked 1st with mean values 3.62 and 3.97 followed by checking of adulteration in pesticides and fertilizers which were ranked 2nd with mean values 3.76 and 3.98, in the pre and post devolution periods, respectively. Likewise, the linkage between extension & farmers was highly developed due to the effect of devolution and was ranked 1st with mean values 3.75 and 4.08, respectively in the pre and post devolution periods. However, modes of training of farming community, arrangements of logistics, budget allocation for agriculture and provision of printed material to farmers could not be improved as a result of devolution in the study area.

Keywords: Agri. Extension, Extension staff, agriculture knowledge, information dissemination, agricultural services.

INTRODUCTION

Economy of Pakistan is based on agriculture, which contributes 19.8% to GDP and generates 45% employment opportunities for labour force of the country. Majority (60%) of the rural population depends directly for its livelihood on this sector (Govt. of Pak., 2016). Despite these facts in Pakistan the production of major crops is the lowest as compared to the world’s averages (Aslam, 2016). This situation demands an effective and efficient extension system in the country. In fact, Agriculture Department (Ext.) since its establishment is trying its level best to improve living standards in the rural areas through increased productivity and farm income. This is only possible through an efficient extension work that can appropriately link findings of research and needs of the farmers thereby making them adopt latest agricultural technology that ultimately increases their production efficiency (Hasan et al., 2013). It is universally recognized that agricultural extension is the main carrier of agriculture knowledge which accelerate the transfer and sharing of knowledge that can be adopted and promote productivity which in turn improves the living standard of rural people in the ever changing climatic situation and eventually helpful for reducing poverty in developing and developed countries (Cadger et al., 2016).

Since independence, different extension approaches like General Extension Approach, Commodity Specialized Approach, Farming System Research/Extension Approach, Cost Sharing Approach, Participatory Extension Approach, Educational Institutional Approach, Project Approach and Training & Visit System have been implemented time to time to benefit the farmers. Keeping in view the weaknesses of all implemented approaches, Devolution plan was implemented in the country in 2001 (Abbas et al., 2009).

In the recent past, governments of many developing countries faced difficulties in the provision of timely and reliable services to farming community in a cost effective and financially sustainable manner. Crop production and farmers’ income declined due to the deterioration of services provided by these governments. Decentralization of the power and functions of different service providing organizations helped the governments in reducing financial burden through improved access and quality of inputs (FAO, 2005). Decentralization aims to achieve improved efficiency in service provision, better accountability to the service users and transparency of service providers because this system responds more closely to people’s preferences economically and politically (Khodamoradi and Abedi, 2011). Empirical literature on decentralization documented mixed outcomes across the world. In Nigeria, government has decentralized the delivery of agricultural services to improve farmers’ access to services and modern inputs. The government not only transferred responsibilities and resources to lower level of government but also transferred decision making power to the civil society. Different institutional and policy environments emerged due to decentralization. Generally, the
involvement of governments in the provision of agricultural services influenced the farmers’ input use positively. However, the government has to focus its agricultural practices/innovations to poor farm households. Enhanced access to agricultural extension services could positively influence modern agriculture through optimal use of agricultural technologies (Akramov, 2009). It is expected that decentralization will ensure access, quality and equity in the provision of agricultural services through the involvement of local farming community in decision making. As lower level governments are fully aware of preferences and local information of their residents so the agricultural services provided by these government organizations better match the requirements and preferences of local populace (World Bank, 2007). The objectives of the study were to compare pre and post devolution period with respect of agricultural extension system, to identify the linkages between different stakeholders in pre and post devolution era and to identify the satisfaction level of EFS about various facilities

MATERIALS AND METHODS

The population for the study comprised farmers and extension field staff (EFS) in the study area, which included 7 districts of the Khyber Pakhtunkhwa province (Peshawar, Charsadda, Nowshera, Mardan, Swabi, Kohat and Hangu). Using Table for determining sample size (Fitzgibbon and Morris, 1987), a sample of 40 farmers and 10 EFS respondents was selected at random from each district from the list provided by Agriculture Department (Extension), thereby making a total of 280 farmer and 70 EFS respondents. For data collection, two separate interview schedules were prepared. The validity of the interview schedules was got checked by the experts in the Agriculture University Peshawar. After making minor amendments, the research instruments were pre-tested for their reliability.

Data analysis: The raw data were arranged and analyzed through computer software SPSS. Percentages, weighted scores, means, standard deviations were computed. The rank order was determined on the basis of the weighted score. In order to know the relative ranking of different variables, the relative scores were computed by multiplying the score value allotted to each category of the scale with the frequency counts.

Percentage: A percentage is a number or ratio expressed as a fraction of 100 and is denoted by sign %. Percentages were calculated in simple and cross tables for the purpose of comparisons. The formula used for computing percentages is:

\[ \text{Percentage} = \frac{F}{N} \times 100 \]

Where F represents the class frequency and N stands for total respondents.

Mean: Mean is sum of values under observations divided by the total number of values. The arithmetic mean of a set of numbers \( X^1, X^2, \ldots, X^n \) is typically denoted by \( \bar{X} \), pronounced "x bar" Arithmetic mean or average can also be used for tabulated presentation of data. It is true representation of the whole data.

\[ \text{A.M or Average} = \frac{\sum Xn}{n} \]

Where, \( \sum \) Total or Sum, \( Xn \) Variables Used in Analysis, \( n \) No. of observations

Weighted score: The weighted scoring method, also known as 'weighting and scoring', is a form of multi-attribute or multi-criterion analysis. This process necessarily assigns numeric values to judgments. It was computed by multiplying score value to scale values.

\[ \text{Weighted score} = F \times S \]

Where, \( F \)=frequency/ score value, \( S \)= Scale value

Standard deviation: The standard deviation (SD) (represented by the Greek letter sigma, \( \sigma \)) measures the amount of variation or dispersion from the average. A low standard deviation indicates that the data points tend to be very close to the mean (also called expected value); a high standard deviation indicates that the data points are spread out over a large range of values. Deviation of a data from its mean is called the standard deviation. If a deviation of its mean is squared then the resulting deviation is called standard deviation.

\[ S.D = \sqrt{\left( \frac{\sum x - X^*}{n} \right)} \]

Where, \( x \)= Value of Observations, \( X^* \)= Mean of a Variable, \( N \)= No. of Observations, \( \sqrt{\cdot} \)= Square Root, \( \sum \)= Summation

RESULTS AND DISCUSSION

Table 1 depicts that the difference between pre and post devolution periods was highly significant in case of supervision of subordinate offices which was ranked 1st with mean values 3.62 and 3.97 followed by checking of adulteration in pesticides and fertilizers which was significant and was ranked 2nd with mean values 3.76 and 3.98, respectively. It means that supervision of subordinate offices and checking of adulteration in pesticides and fertilizers were significantly improved under devolution period. However, the difference was non-significant in case of modes of training of farming community, arrangements of logistics, budget allocation for agriculture and provision of printed material to farmers. It means that devolution of powers did not improve these features of agricultural extension in the study area.

The highly significant difference in the supervision of subordinate offices in the pre and post devolution periods may be due to the improvement in mobility provided by the district governments which enabled officers to frequently visit and supervise their subordinate offices.

The mean values indicate that responses of extension field staff regarding almost all aspects of agricultural extension system ranged from satisfactory to good but tended towards good.

These findings are in accordance with those of Gombe et al. (2015) who concluded that participatory technology
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Table 1. Comparison of pre and post-devolution period with respect to various aspects of agricultural extension system as perceived by EFS respondents.

<table>
<thead>
<tr>
<th>Aspects of extension system</th>
<th>Pre-devolution</th>
<th>Post-devolution</th>
<th>t-value</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Training of farming community</td>
<td>3.38 (5)</td>
<td>1.18</td>
<td>3.50</td>
<td>1.10</td>
</tr>
<tr>
<td>Arrangement of logistics</td>
<td>3.78 (4)</td>
<td>0.80</td>
<td>3.92</td>
<td>0.77</td>
</tr>
<tr>
<td>Budget allocation for agriculture</td>
<td>3.84 (3)</td>
<td>0.78</td>
<td>3.82</td>
<td>0.79</td>
</tr>
<tr>
<td>Supervision of subordinate offices</td>
<td>3.62 (1)</td>
<td>0.78</td>
<td>3.97</td>
<td>0.80</td>
</tr>
<tr>
<td>Provision of printed material to farmers</td>
<td>3.83 (6)</td>
<td>0.71</td>
<td>3.90</td>
<td>0.74</td>
</tr>
<tr>
<td>Checking of adulteration in pesticides and fertilizers</td>
<td>3.76 (2)</td>
<td>0.75</td>
<td>3.98</td>
<td>0.76</td>
</tr>
</tbody>
</table>

Source: Field data; NS = Non-significant (P>0.05); * = Significant (P<0.05); ** = Highly significant (P<0.01).

Table 2. Comparison of pre and post-devolution period with respect to linkages development among agricultural extension, farming community and research system as perceived by farmer respondents.

<table>
<thead>
<tr>
<th>Linkages development between</th>
<th>Pre-devolution</th>
<th>Post-devolution</th>
<th>t-value</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Research &amp; extension</td>
<td>3.95 (3)</td>
<td>0.78</td>
<td>4.11</td>
<td>0.77</td>
</tr>
<tr>
<td>Extension &amp; farmers</td>
<td>3.75 (1)</td>
<td>0.77</td>
<td>4.08</td>
<td>0.82</td>
</tr>
<tr>
<td>Farmers &amp; research</td>
<td>3.98 (2)</td>
<td>0.82</td>
<td>4.04</td>
<td>0.76</td>
</tr>
</tbody>
</table>

Source: Field data; NS = Non-significant (P>0.05); * = Significant (P<0.05); ** = Highly significant (P<0.01), n=280.

Development approach had a positive impact on extension work by improving extension workers competencies through activities in participatory techniques, trainings sessions, result demonstration, organizational development, resource management and program development.

The information recorded in Table 2 depicts that the difference between pre and post devolution periods was highly significant in case of linkages development between extension and farmers which was ranked 1st with mean values 3.75 and 4.08 respectively. It implies that linkages between extension and farmers were improved significantly under the devolution of power plan period. However, there existed a non-significant difference in linkages development between research-extension and farmers-research, which means that these aspects could not be improved under devolution.

The highly significant difference between the pre and post devolution periods regarding linkages development between extension and farmers may be due to the reason that farmers had easy access to extension workers for being locally available to them in their respective areas. It may also be due to the frequent visits of the EFS to the farming community round the cropping season.

The mean values indicate that responses of farmer respondents regarding linkage development among all the stakeholders ranged from satisfactory to good but tended towards good in the pre devolution scenario whereas it ranged from good to excellent but tended towards good in the post devolution period.

These findings are supported by those of Sewnet et al. (2016) who stated that agricultural extension serves as a two-way information link between farmers and researchers. It means agricultural extension reports the problems of farmers from field to research stations and outcome of research is disseminated back to the farmers. Similarly, David (2007) stated that extension is meant to develop a crucial communication link between farming community and research organizations and is widely regarded as a service playing an important role in improving agricultural systems worldwide.

Table 3 shows that the difference between pre and post devolution periods was significant in case of information flow from extension to research, which was ranked 1st with mean values 3.71 and 3.99, respectively. It shows that information flow from extension to research was improved significantly under devolution period. However, the difference was non-significant in case of information flow from research to extension, extension to farming community and from farming community to extension. It means that these linkages could not be improved as a result of devolution.

The mean values show that responses of farmer respondents regarding information flow among various stakeholders in pre and post devolution periods ranged from satisfactory to good and it was tending towards good.

These findings are supported by those of Sewnet et al. (2016) who concluded that agricultural extension reports the problems of farmers from field to research stations and outcome of research is disseminated back to the farmers. Likewise, Akintonde et al. (2012) concluded that T&V system provided an organizational structure and comprehensive delivery medium by ensuring the regular visit of extension field workers and transferring information relevant to farmers’ needs and problems. These findings are
REFERENCES

**Table 3. Comparison of pre and post-devolution period with respect to information flow among the main stakeholders as perceived by EFS respondents.**

<table>
<thead>
<tr>
<th>Information flow from:</th>
<th>Pre-devolution</th>
<th>Post-devolution</th>
<th>t-value</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research to extension</td>
<td>3.90 (4)</td>
<td>3.92 (0.87)</td>
<td>0.00</td>
<td>1.0000 NS</td>
</tr>
<tr>
<td>Extension to farming community</td>
<td>3.98 (2)</td>
<td>3.95 (0.84)</td>
<td>-1.78</td>
<td>0.0765 NS</td>
</tr>
<tr>
<td>Farming community to extension</td>
<td>3.62 (3)</td>
<td>3.68 (0.84)</td>
<td>0.22</td>
<td>0.7226 NS</td>
</tr>
<tr>
<td>Extension to research</td>
<td>3.71 (1)</td>
<td>3.99 (0.80)</td>
<td>-2.03</td>
<td>0.0436 *</td>
</tr>
</tbody>
</table>

Source: Field data  NS = Non-significant (P>0.05); * = Significant (P<0.05); ** = Highly significant (P<0.01); n=280.

**Table 4. Comparison of pre and post-devolution period with respect to satisfaction obtained from various facilities as perceived by EFS respondents.**

<table>
<thead>
<tr>
<th>Satisfaction Level</th>
<th>Pre-devolution</th>
<th>Post-devolution</th>
<th>t-value</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honoraria</td>
<td>3.74 (4)</td>
<td>3.86 (0.81)</td>
<td>-1.18</td>
<td>0.2405 NS</td>
</tr>
<tr>
<td>Mobility</td>
<td>3.71 (3)</td>
<td>3.93 (0.72)</td>
<td>-2.17</td>
<td>0.0311 *</td>
</tr>
<tr>
<td>Working environment</td>
<td>3.64 (1)</td>
<td>4.05 (0.68)</td>
<td>-3.74</td>
<td>0.0002 **</td>
</tr>
<tr>
<td>Monitoring and evaluation</td>
<td>3.57 (5)</td>
<td>3.66 (0.78)</td>
<td>-0.79</td>
<td>0.4275 NS</td>
</tr>
</tbody>
</table>

Source: Field data; NS = Non-significant (P>0.05); * = Significant (P<0.05); ** = Highly significant (P<0.01); n=70.

contradictory to those of Luqman et al. (2016) who reported that non-state actors played effective role in dissemination of information as compared to state actors. Moreover, agricultural services were successfully rendered by private sector in the study area.

The data given in Table 4 depicts that the difference between pre and post devolution periods was highly significant in case of satisfaction obtained from the job and working environment which were ranked 1st and 2nd with mean values 3.64, 4.05 and 3.58, 3.89, respectively. While difference between pre and post devolution periods was significant in case of mobility which was ranked 3rd with mean values 3.71 and 3.93, respectively. It means that satisfaction obtained from the job, working environment and mobility were improved as a result of devolution. However, there existed a non-significant difference in case of honoraria and monitoring and evaluation of the activities which could not be improved during devolution period.

Highly significant difference between the responses regarding satisfaction from job and working environment may be due to the provision of mobility by the district governments as well as various multinational projects working for the development of agricultural sector in the area, and increased monitoring and evaluation through an integrated development approach. The mean values show that satisfaction level of EFS respondents regarding various aspects in the pre and post devolution periods ranged from satisfactory to good but tended towards good categories.

**Conclusions and recommendations:** It can be concluded from the study that devolution of power has positive effect on various aspects of agricultural extension. Significant improvements were achieved in the aspects of supervision of subordinate offices and checking of adulteration in pesticides and fertilizers through improved mobility provided to officers working in the area. Linkages between extension and farmers were improved as a result of increased interaction for communicating research findings conducted at various research stations. Similarly, satisfaction level regarding jobs, working environment and facilities of mobility were improved due to provision of better vehicles by the district governments and foreign funded projects working for dissemination of latest agricultural technologies among the farmers. However, aspects of training of farming community, arrangement of logistics, budget allocation for agricultural extension activities, provision of printed material to farmers for their guidance, feedback to research and extension, linkages between farmers and research, flow of information from research to extension, and vice versa and from farming community to extension, honoraria provided by the department as well as monitoring and evaluation could not be improved as a result of devolution in the area which need due attention of the concerned authorities for further improvements.
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